POLLUTION SURVEY SWASTIKA AREA TOWN OF KIRKLAND LAKE (TOWNSHIP OF TECK)

Ontario
Ministry of the Environment

North-Eastern Region
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POLLUTION SURVEY

SWASTIKA AREA

TOWN OF KIRKLAND LAKE (TOWNSHIP OF TECK)

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Municipal & Private Abatement
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INDEX

	PAGE NUMBER
INTRODUCTION	1
GENERAL INFORMATION	2
WEATHER	3
TECHNIQUE	
1. Field Work	4
2. Handling of Samples	4
3. Significance of Results	4&5
4. Samples Results	5
5. Maps	5&6
SANITARY WASTE DISPOSAL	
1. Sewered Areas	
i) Septic Tank #1	7
ii) Septic Tank #2	7&8
2. Unsewered Areas	
i) Peck Avenue	8,9,10
ii) Swastika Avenue	10,11
iii) Hays Street	11,12,13&14
BLANCHE RIVER AND DRAINAGE AREA	
1. Upstream of the Duck Pond	15
2. The Duck Pond	15,16&17
3. Downstream from the Duck Pond	17
AMIKOUGAMI CREEK	18
DRINKING WATER SUPPLIES	19
SUMMARY AND CONCLUSIONS	20&21
RECOMMENDATIONS	22
APPENDIX I	
SIGNIFICANCE OF LABORATORY ANALYSIS	
Bacteriological Examination	23
CHEMICAL ANALYSES	
Total Kjeldahl	24
Nitrite Nitrogen	24
Nitrate Nitrogen	25
Total Phosphorus	25
Phenols	25
Biochemical Oxygen Demand (BOD)	26
TABLES	27
TABLE I - Results of Bacteriological Examination Blanche River	28
TABLE II- Bacteriological Sample Results	29
TABLE III- Bacteriological Sample Results	30
TABLE IV - Chemical Analysis	31

INTRODUCTION

On July 7th through to the 9th, 1975 a sanitary survey was conducted in the community of Swastika by three staff members of the Ministry of the Environment. This preliminary sampling program was designed to determine what methods of sewage disposal are being employed in the community, to seek out problems resulting from these practices, and to ascertain if the need for a sewage treatment plant exists. A total of fourty-four bacteriological, eight chemical and four phenol samples were obtained from ditches in the Swastika vicinity as well as from various locations on the Blanche River, to ascertain the amount and sources of pollution entering this river.

GENERAL INFORMATION

Swastika, a community with a 1974 assessed population of 630, is part of the Town of Kirkland Lake within the geographic Township of Teck. It is situated approximately five miles southwest of the town centre of Kirkland Lake on Highway #66. For the purpose of this survey, the study boundaries included the commercial establishments at the junction of Highway #66 and Highway #112, and the area extending to Culver Park, in the south of Swastika's developed area. The portion of the Blanche River of interest in this survey flows out of Kenogami Lake and travels in a westerly direction entering Otto Lake after passing through Swastika. Drainage for most of the community is discharged into Blanche River; the Highway #66 - #112 portion of the study area is drained by Amikougami Creek, a tributary of the Blanche River.

Weather

Prior to this survey the weather was unusually hot and dry. The precipitation amounts in the following table were obtained from the Earlton Airport.

MONTH/DAY	PRECIPITATION IN INCHES
June 23	0
June 24	0
June 25	0
June 26	0
June 27	0
June 28	0
June 29	0
June 30	0
July 01	0
July 02	.64
July 03	0
July 04	Trace
July 05	Trace
July 06	0
July 07	.43
July 08	.01
July 09	0
Total	1.08

TECHNICQUE

1. Field Work

Interviews with residents living in unsewered areas were conducted by the three members of the survey team, to determine the methods of sewage disposal being utilized. All these unsewered areas are connected to the town water supply system.

Where possible, ditches in unsewered areas as well as those originating from the two communal septic tanks were inspected in order to locate the source and discharge point of each ditch. To ascertain what levels of pollution were present in these ditches, bacteriological samples were obtained.

2. Handling of Samples

Bacteriological samples were kept packed in ice to avoid significant change in numbers of coliform bacteria, which could cause unreliable sample results. These samples were shipped daily to the Provincial Health Laboratory in Timmins via the Ontario Northland Bus.

Chemical and phenol samples were sent by train to the Ministry of the Environment Laboratory in Toronto.

3. Significance of Results

The level of coliform bacteria present has been used as an indication of the amount of pollution existing in the water source from which the sample was taken. Coliform organisms are a species of bacteria which normally inhabit soil and vegetation and are present in the faecal matter of humans and warm blooded animals. Bacteriological pollution is indicated by levels exceeding 1000 total coliform/100 mls and 100 faecal coliform/100 mls. Human faecal matter is the major source of unnaturally high coliform levels.

Total coliform counts of $80,000^{+}$/100 mls coupled with faecal coliform counts of $8,000^{+}$/100 mls are indicative of raw sewage. The count of coliform organisms actually present may be in excess of 10 million/100 mls; the lower counts are due to the testing limits used in the laboratory. The laboratory bacteriological examination procedure has been explained in Appendix I, under bacteriological examination.

4. Sample Results

The results obtained from the bacteriological examinations are listed in Table I, II, and III. Included are the sample number and the location of each sample taken, as well as the examination results.

Chemical analysis results are listed in Table IV. The location of each sample has also been described in this table. The corresponding results of the bacteriological examination have been included in this table to facilitate a comprehensive evaluation of the water quality at these sample points.

5. Maps

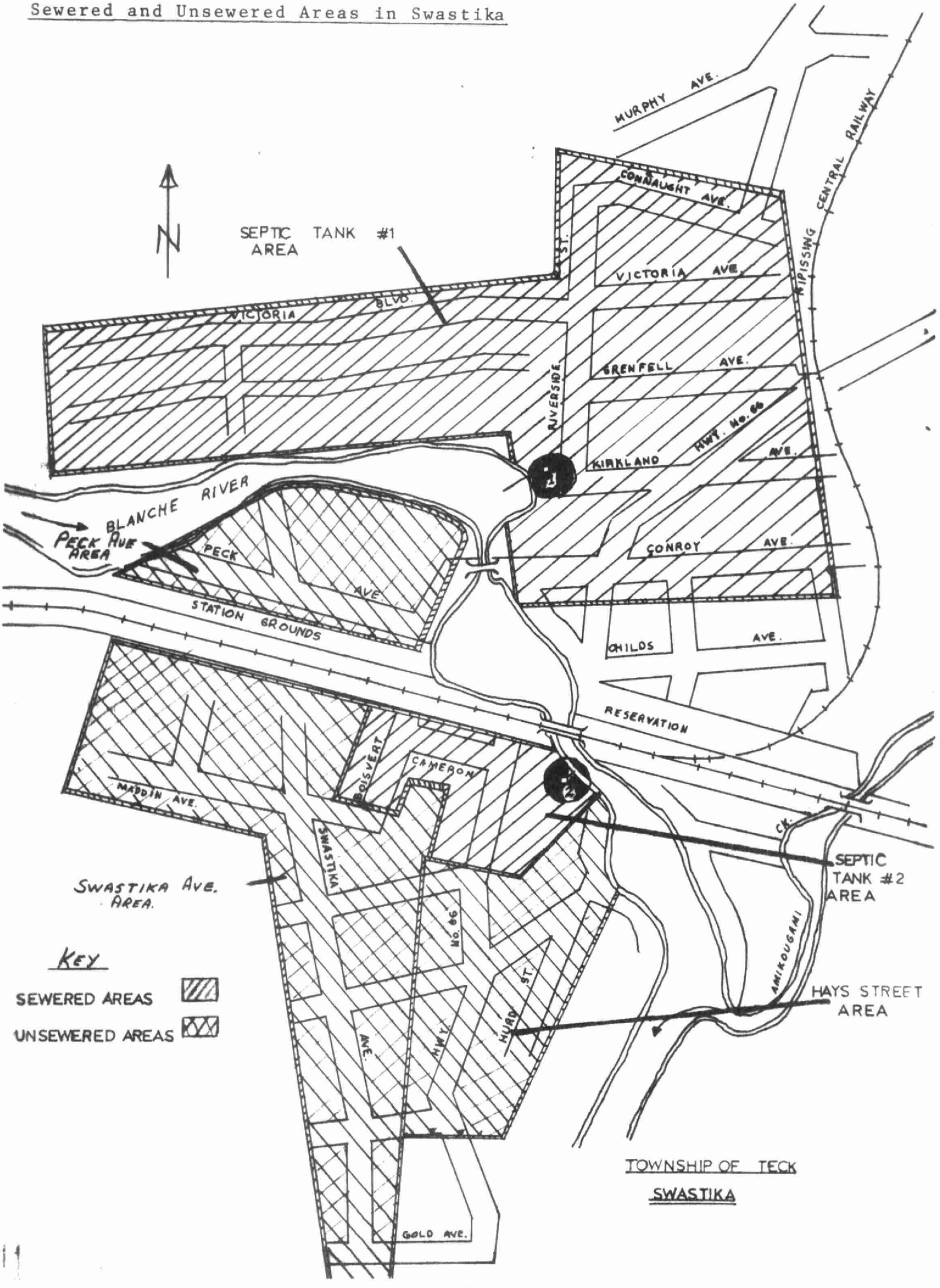
Appended to this report are two maps of the Swastika vicinity.

> Map #1 shows, for the urbanized area of Swastika, the location of sample points, ditches, communal septic tanks, sanitary sewers, and the street taps which provide water for homes lacking connection to the town water line.
>
> Map #2 shows an enlarged view of the Blanche River - Amikougami Creek vicinity. Sample points located on Amikougami Creek have been shown.

To facilitate easy reference a small map of Swastika has been included on the next page. Five of the six study areas are shown on this map. The sewered areas serviced by Septic Tank #1 and Septic Tank #2 are shown along with the following unsewered areas:

Peck Avenue
Swastika Avenue
and Hays Street.

Sewered and Unsewered Areas in Swastika



SANITARY WASTE DISPOSAL

1. Sewered Areas

Sewage treatment for the areas of Swastika which are serviced by sanitary sewers is accomplished by two large communal septic tanks. Large single compartment communal septic tanks typical of the two being used in Swastika provide only partial clarification of the raw sewage during the short retention period. This allows only the heavier particulate matter to settle out and does little to change bacteriological content.

i) Septic Tank #1

Septic Tank #1, a large concrete structure consisting of two compartments is located at the west end of Kirkland Avenue beside the Duck Pond at the Swastika Firemen's Park. This tank receives wastes from west of the Ontario Northland Railway and south of and including Connaught Avenue, as well as the homes located on Athenia and Victoria Blvd., immediately north of the Blanche River. The effluent from the septic tank is presumably discharged into the Duck Pond. Eight bacteriological sampling points upstream from the Duck Pond revealed little change in total and faecal coliform levels in this upper portion of the Blanche River, with an average of 24 total coliforms/100 mls and 16 faecal coliforms/100 mls.

ii) Septic Tank #2

A second communal septic tank, situated on the south west bank of the Blanche River east of Cameron Street, receives the wastes from the sanitary sewers which serve the area south of the railway tracks. Consisting of a single compartment, the tank is extremely rusted and in poor condition; at ground level, approximately one foot below the top, the tank appears to be corroding and the exterior is coated with black scum.

One small leak in the tank permitted minimal flow of effluent. Effluent discharge directly to the Blanche River occurs via a wooden pipe which is itself in need of repair. Sample results exceeded $80,000^{+}$ total and $8,000^{+}$ faecal coliform organisms/100 mls in a bacteriological sample obtained from the effluent of the tank. On August 19, two members of the survey team returned to inspect this septic tank. Several large leaks, some greater than two inches across, were present in one corner of the tank. No flow was coming from the effluent pipe since the leaks facilitated the flow of a large volume of liquid. The survey team made at least four visits to this area, and each time the odour of sewage was very strong. A resident stated that the odour of sewage is prevalent in the immediate vicinity at all times.

2. Unsewered Areas

Individuals from a total of 29 of the 38 houses which are not provided with sanitary sewers were interviewed by the survey team. Inquiries concerned sewage disposal, waste wash water disposal, and drinking water source. A variety of sewage disposal techniques are used; 16 homes had private septic tanks, 6 homes had outdoor privies, 1 home had a cesspool and 6 other homes had indoor pail privies. Pails are either emptied at the dump or in shallow pits on their property.

i) Peck Avenue

The Peck Avenue - Gull Street vicinity contains 13 houses with no municipal sanitary sewers or water line connections. In 8 of these homes, the residents interviewed reported that 2 of their homes were serviced by privies, and 1 residence used a cesspool. Individuals in 1 residence use a pail which is emptied in an uncovered pit in their back yard.

A bacteriological sample (D-1) with a total coliform count of 23,000/100 mls and a faecal coliform count of $8,000^{+}$/100 mls, was taken from the outflow from a large concrete catch basin adjacent to the railway tracks south of Peck Avenue. The catch basin, intended to drain the train track area, contained a large amount of water, rust and oil, deposits of which have presumably been responsible for inhibiting drainage of the liquid from the basin. The catch basin is approximately 6 feet high and was filled almost to the top with rust coloured liquid. A slow trickle of liquid emerged from the three outflow pipes located at the bottom of the structure. The high coliform count suggests that sewage from the unsewered area on Maddin Avenue or from the Esso warehouse, geographically higher than the catch basin, may be gaining access to this catch basin.

Analysis of a chemical sample yielded a total kjeldahl nitrogen level of 2.5 ppm, significantly higher than the acceptable range of 0.1 to 0.5 ppm. This level indicates that an excessive amount of organic nitrogen was present, the origin of which was probably sewage. Low nitrite and nitrate levels of less than 0.02 ppm and 0.2 ppm respectively were obtained. When such levels accompany a high kjeldahl result it indicates that pollution has occurred recently; bacteria have not had sufficient time to decompose the organic nitrogen to its inorganic nitrite and nitrate forms.

Discharge from the catch basin flows into a ditch flowing south of Peck Avenue and parallel to the railway tracks. A deep rust colour and deposits of oil were present in both the soil and the ditch water.

The ditch water flows eastward and enters the Blanche River. Downstream from the catch basin, a sample (D-2) yielded a total coliform count of 3300/100 mls and a faecal coliform count of 2100/100 mls. There is a possibility that the unsewered houses situated on Peck Avenue are contributing additional pollution to this ditch, although the flatness of the land here makes this questionable.

An interview with a Peck Avenue resident revealed that underground pipes once existed to the north of the houses facing south on Peck Avenue. Their purpose was to provide removal of domestic wastes to the Blanche River. Apparently, blockage of the exit of this system occurred when a construction company filled in the land west of the Conroy Avenue bridge. A sample (D-3) acquired from a puddle on the filled land had total and faecal coliform counts of 4200/100 ml and 3500/100 respectively, suggesting that ponding of sewage effluent is occurring.

A routine check behind these houses on Peck Avenue failed to reveal any ditches, odours, or ponding of sewage, suggesting that this underground pipe system may still be transporting sewage to the Blanche River.

ii) Swastika Avenue

Another locality lacking in sanitary sewer and water line connections can be found in the Swastika Avenue - Maddin Avenue - Gold Avenue area, west of Hays Street. Eight homes reportedly have privately-owned septic tanks. Residents from four other homes use pails for sewage disposal. A total of sixteen unsewered homes exist in this area.

A sample (D-4) from a ditch situated parallel to and at the southern most end of Swastika Avenue to the south of Gold Avenue, contained a total and faecal coliform count of 5100/100 mls and 2800/100 mls respectively. A culvert passing under Swastika Avenue, providing drainage for the west side of Swastika Avenue, may be collecting wastes from septic tanks serving the two homes in the drainage area.

A ditch was found that flowed eastward onto Hays Street, originating in the unsewered Swastika Avenue area. A sample (D-5) result of $80,000^{+}$ total coliform/100 mls and $8,000^{+}$ faecal coliform/100 mls indicates that raw sewage is emanating from improperly functioning sewage disposal systems on Swastika Avenue. Further evidence confirming the presence of sewage is given by the high kjeldahl nitrogen level of 23 ppm. A large amount of organic nitrogenous matter has been produced by the sewage. The nitrate level of 0.04 ppm signifies that decomposition was taking place.

iii) Hays Street

On the southern end of Hays Street nine homes with no sanitary sewer connections are present. Among residents interviewed, four reported their homes are serviced by septic tanks and two by privies. One residence uses the pail method of sewage disposal.

A sample (D-6) taken from a ditch on the east side of Hays Street yielded coliform counts indicative of untreated sewage. This ditch likely has its source in the unsewered area of Swastika Avenue and flows eastward under Hays Street via a culvert. The exact source of the ditch was not pinpointed due to the extreme dryness of the weather prior to the survey. However, a leaking cesspool was located upstream from the sample point; seepage from this cesspool would undoubtedly enter the ditch during heavy rainfall and periods of wet weather.

After passing under Hays Street, flow in the ditch changes to a northeasterly direction. At this point a sample (D-7) yielded a high faecal coliform count of 5,400/100 ml. The ditch continues on, curving behind the Esso Gas Station which faces Hays Street. Here a deep rust colour was predominant, as well as the unpleasant odour which customarily accompanies raw sewage. Total and faecal coliform counts (D-8) were $80,000^{+}$/100 mls and $8,000^{+}$/100 mls respectively. These levels are indicative of raw sewage. The kjeldahl nitrogen level was 10 ppm; discharge of sewage could account for such a large concentration of organic nitrogenous matter. Although the urban area west of this ditch is serviced by sanitary sewers, the white frame house to the northeast of the Esso Station is unsewered; this may be the source of the pollution which was found to be present. Beyond this point the ditch reverts to its eastwardly course, discharging into the Blanche River. At the mouth of the ditch, the coliform level drops off significantly, with a sample (D-9) producing a total coliform count of 510/100 ml and a faecal coliform count of 44/100 ml. The kjeldahl nitrogen level was also reduced (0.8 ppm), which is only slightly above the desirable range. The total phosphorus level of 0.08 ppm exceeded the level which is known to contribute to algae growth.

iv) Highway #66 - Highway #112

Residences and commercial buildings located along the portion of Highway #66 which was included in the survey of Swastika generally use septic tank systems for sewage disposal.

Several ditches or large puddles were located behind the Ministry of Natural Resources, the Ministry of Transportation and Communications, the Kirk Motel, and the B.P. Gas Station, all of which are situated on the northwest side of Highway #66, north of the junction of this highway and Amikougami Creek. Although the ditches are not interconnected there is a possibility that flow occurs in a south westerly direction, during the spring runoff or periods of wet weather, facilitating discharge into Amikougami Creek.

A ditch with a particularly bright rust colour and sewage-like odour located behind the Ministry of Natural Resources' garage yielded a sample (D-10) with a total coliform count of 9,000/100 ml and a faecal coliform count of 200/100 ml. The rust colour continues in a series of puddles, with the greatest concentration of colour present in a puddle behind the Ministry of Transportation and Communications' garage.

Chemical analysis here revealed a relatively high kjeldahl of 7.0 ppm. Low nitrite and nitrate levels confirm that the pollution is recent, since bacteria have not yet appreciably decomposed the organic nitrogen present in the pond. An excessively high level of 22,350 mg/l of chloride was obtained. A sand pile located less than 30 feet from this puddle is the probable source; since salt is mixed with the sand to keep it from freezing so it can be spread on the roads in winter.

Northeast of this point a small pond behind the Kirk Motel produced extremely high total and faecal coliform counts ($80,000^{+}$ total/100 ml and $8,000^{+}$ faecal/100 ml), which indicate the presence of raw sewage.

Behind the B.P. Station a bacteriological sample contained coliform level of 400/100 mls and a faecal coliform level of 20/100 mls.

Although the sample results are not excessively high a malfunctioning septic tank system serving the gas station is known to exist. Both the owner of the gas station and the Timiskaming Health Unit are aware of this problem.

THE BLANCHE RIVER AND DRAINAGE AREA

Pollution entering the Blanche River from Swastika is known to be contributing to the eutrophication or accelerated aging, of Round Lake into which it flows (via Otto Lake). According to a water quality evaluation conducted in the summer of 1974 by the Ministry of the Environment's Technical Support Section of the Northeastern Region, large inputs of domestic sewage which contain phosphorus and nitrogen, supply excess nutrients for algae and result in undesirable algae blooms in Round Lake.

1. Upstream of the Duck Pond

Upstream from Swastika's centre, the Blanche River is basically a slow-flowing shallow river, with a muddy brown opaque appearance. As previously mentioned, the river was sampled for coliform bacteria at eight points upstream from the Duck Pond into which septic tank number one discharges. The total and faecal coliform levels remain the same, changing little from shore to shore or between successive downstream sample points. The low levels of pollution present, (an average of 24 total coliform/100 mls and 16 faecal coliform/100 ml) indicate that there is no unnatural source of these coliforms immediately upstream.

2. The Duck Pond

After flowing through shallow rapids, the Blanche River widens into an area known as the Duck Pond, surrounded by the Swastika Firemen's Park. Water enters the pond from a westerly direction, exiting at the southern portion of the pond. The pond appears to be extremely shallow, with an average depth of less than three feet. Weeds are clustered on the northeast shore along with driftwood and debris. Flecks of foam resembling soap suds were observed to be scattered thinly over the entire surface during each of four visits made to this area by the survey team.

On one occasion a thick brown foam floating near the southeast shore was observed.

The bacteria counts obtained from the pond were indicative of raw sewage. An average of the four bacteriological samples from the pond gave a total coliform level of 7400/100 ml and faecal coliform level of 5800/100 ml. Two samples contained faecal coliform counts in excess of 8,000/100 mls. The level of pollution failed to vary significantly among different sample locations in the pond. Four storm sewers discharge into this pond. A twenty-four inch pipe situated on the northern shore of the pond is the outlet for the drainage area which includes the eastern portions of Athenia and Victoria Blvd. The mouth of this pipe was partially submerged in the water of the pond, making it impossible to obtain a sample of flow exclusively from the drainage area.

A second storm sewer discharging at the northeast shore of the pond provides drainage to the Riverside Street vicinity. There was no flow from this eighteen inch diameter pipe. In the three weeks prior to this survey, extremely hot and dry weather was prevalent; approximately one inch of rain fell during that time period.

Two other storm sewer outlet pipes, (dry during the survey) are located on the eastern shore of the pond. These pipes are thirty inches in diameter and drain the relatively large developed area which is south of Connaught Avenue and north of Westinghouse Avenue.

No storm sewers have been provided in the section of Swastika located to the south of the Blanche River; runoff is collected in roadside ditches.

Three of the four bacteriological samples from the pond (referred to previously) were obtained near each of these storm sewer outlets. It is unlikely that the high coliform levels are the result of flow from the storm sewer system, since all areas served by the storm sewers have also been provided with sanitary sewers.

The discharge of effluent from septic tank #1 into the Duck Pond is undoubtedly the source of this pollution. Discharge presumably occurs via a submerged pipe leading into the Duck Pond. Any pollution originating from the storm sewer system would probably be negligeable in comparison with that produced by the communal septic tank.

3. Downstream from Duck Pond

Five sample points downstream from the Duck Pond showed that coliform levels remain unaltered, with the average total coliform count at 7000/100 mls and the average faecal coliform count at 2400/100 mls. Another sample from the river mouth near its entry to Otto Lake produced a total coliform count of 700/100 mls and a faecal coliform count of 600/100 mls. The pollution level has decreased, but a significant amount of faecal contamination remains. The level of phosphorus is 0.04 ppm, slightly above the level which encourages algal growth.

AMIKOUGAMI CREEK

Amikougami Creek has its source in Amikougami Lake, located to the northwest of the Kirkland Lake area. It flows into the Blanche River east of the urban area of Swastika and prior to the entry of the Blanche River into Otto Lake.

Five locations in this creek were sampled between the point at which it crosses Highway #66 and where it enters the Blanche River. There is a continual rise in the faecal coliform count as one travels downstream, suggesting an increasing or more recent input of sewage. Residences or other establishments adjacent to the creek may be producing this pollution. A noteable increase in the faecal coliform level at the third sample point downstream from the junction of the creek and the Highway (AC-3) is probably the result of a malfunctioning septic tank used by the residence located at this point.

DRINKING WATER SUPPLIES

Twenty-one of the residences surveyed were not provided with connections to the town water lines. Sixteen individuals from these residences report that they carry their drinking water from municipal public taps connected to the town water line, the taps were supplied specifically for residents without water. Bacteriological analysis of the chlorinated water acquired from several of these taps was in all cases free from bacteria and safe to drink. Four of the remaining residences use private wells and one uses spring water.

SUMMARY AND CONCLUSIONS

There are two separate areas of Swastika which are supplied with sanitary sewers. Each area is served by its own large communal septic tank. Effluent from septic tank #1, serving the northern area of the community discharges into the Duck Pond of the Blanche River. Further downstream effluent from septic tank #2, serving a smaller portion of the community located to the south of the railway tracks is also discharged to the Blanche River. Significant rises in coliform levels in the river water are caused by the discharges from these tanks; the raw sewage enters the river virtually untreated. No ditches or ponds of effluent high in coliform levels were observed in the residential areas served by these tanks.

Four unsewered areas exist in the following areas of the community: Peck Avenue, Swastika Avenue, Hays Street, and Highway #66 - Highway #112. Septic tanks, cesspools, outdoor privies and pail privies are used for sewage disposal in these areas. A total of eight ditches or ponds of water resulting from inadequate methods of sewage disposal were found in the unsewered areas. In all cases bacteriological examinations of the water in these water bodies confirmed the presence of raw sewage.

Coliform counts in the Blanche River upstream from the Duck Pond are low and likely due to natural surface runoff. The effluent from the two septic tanks adds a great deal of pollution to the river. As well, pollution from ditches originating in unsewered areas and pollution carried by Amikougami Creek increase the level of pollution entering the river. Sewage disposal in Swastika is causing the gross pollution of the Blanche River downstream of the Duck Pond.

The addition of sewage to the river seriously decreases the water quality by adding large amounts of organic matter as well as high levels of bacteria and viruses. Bacteria which oxidize these organic substances consume large quantities of oxygen, thereby reducing the amount of dissolved oxygen present in the water. Although tests to ascertain the level of dissolved oxygen in the Blanche River were not performed, it is known that undesirable odours and unsightly conditions were reported for this portion of the river. Fish and other aquatic organisms may die from the reduced availability of oxygen, leading to further addition of organic materials to the water and a subsequent increase in pollution. The addition of nutrients to the river system is contributing to the water quality problems in Otto and Round Lakes.

RECOMMENDATIONS

In view of the pollution being caused by the present sewage disposal practices within Swastika and the lack of sufficient room on the small lots to permit adequate waste water disposal on an individual basis it is recommended that communal sewage collection and treatment facilities be developed for this community within Kirkland Lake.

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APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSIS

Bacteriological Examination

The presence of coliform bacteria in water is used as an indication of the amount of existing pollution. Faecal coliform counts greater than 100/100 mls accompanied by total coliform counts exceeding 1000/100 mls denote that contamination of sewage origin has occurred.

The Ontario Health Laboratory which performed the bacteriological analysis employs the Membrane Filter (M.F.) technique of examination. A membrane with small pores is used to filter a known volume of water. The filter is placed in a culture medium which favours the growth of the organism for which the sample is to be examined. After an incubation period the number of colonies of bacteria present are counted, allowing the determination of the number of organisms present in the original water sample.

CHEMICAL ANALYSES

Total Kjeldahl Nitrogen

Total kjeldahl nitrogen is a measure of the organic nitrogen plus the inorganic free ammonia yields the amount of organic nitrogen present. The normal range for total kjeldahl is 0.1 to 0.05 ppm.

Nitrogen is converted during a sequence of biochemical reactions from the organic to the nitrite and then nitrate forms. The relative concentrations of these compounds can be used as an indication of how far these reactions have progressed. A high kjeldahl accompanied by low nitrite and nitrate levels may indicate a recent input of sewage. Organic nitrogen in the sewage has not yet had sufficient time to decompose to the more highly oxidized products in the nitrogen cycle.

Nitrite Nitrogen

Nitrite is an intermediate substance formed by autotrophic nitrifying bacteria during the decomposition of organic nitrogen and prior to the formation of nitrate. Since nitrite is highly unstable, bacteria rapidly convert it to other compounds. Nitrite levels exceeding 0.02 ppm denote that bacterial action is taking place.

Nitrate Nitrogen

Bacteria which oxidize nitrite form nitrate, the end product in the decomposition of organic nitrogen. The relative concentration of nitrate signifies to what extent organic nitrogenous matter has been broken down. High nitrate levels are undesirable in drinking water supplies because they contribute to methemoglobinemia in infants; high levels of nitrate in surface waters serve to promote undesired algal growth. A low concentration would be 0.1 ppm, with a moderate concentration in the range of 0.1 to 1.0 ppm; a high concentration would exceed 1.0 ppm.

Total Phosphorus

To maintain the balance between plant and animal life, a certain amount of phosphorus is essential. However, unnaturally high inputs of phosphorus from sources such as fertilizers, synthetic detergents and sewage promote algae growth seriously decreasing the quality of the water. Levels of inorganic phosphorus greater than 0.01 ppm are known to contribute to the development of algae.

Phenols

Phenolic substances contained in a water sample generally originate from petroleum products, gaining access to water courses from industrial pollution. Phenol levels for domestic water supplies must not exceed 1 ppb; acceptable limits for surface water supplies must not be greater than 20 ppb.

Biochemical Oxygen Demand (BOD)

Chemical reactions performed by bacteria during the decomposition of organic matter in the water deplete the amount of dissolved oxygen available. To measure the biochemical oxygen demand, the sample is aerated, sealed and incubated at 20 degrees C for a five day period. The residual oxygen consumed is roughly proportional to the amount of biodegradable organic matter present. It is assumed that the BOD from natural sources will not exceed 3 mg/l. Higher BOD results show that larger quantity of oxygen will be required to stabilize the organic waste and; therefore that a proportionally large amount of organic matter is present.

TABLES

TABLE I - BACTERIOLOGICAL SAMPLE RESULTS
BLANCHE RIVER

TABLE II - BACTERIOLOGICAL SAMPLE RESULTS
AMIKOUGAMI CREEK

TABLE III - BACTERIOLOGICAL SAMPLE RESULTS
AMIKOUGAMI CREEK

TABLE IV - CHEMICAL ANALYSIS

TOWNSHIP OF TECK
SWASTIKA
TABLE I - RESULTS OF BACTERIOLOGICAL EXAMINATION

SAMPLE NUMBER	LOCATION	COLIFORM COUNT Per 100 mls TOTAL	FAECAL
BR1A	Approximately 50 feet upstream from pumphouse where town water supply is obtained	14	14
BR1B	Directly across river from BR1A	26	14
BR2A	Approximately 200 feet downstream from pumphouse	20	20
BR2B	Directly across river from BR1B, on edge of ONR property	12	12
BR3A	Approximately 400 feet downstream from pumphouse	50	14
BR3B	Directly across river from BR3A	20	18
BR4A	Below rapids at entry to Duck Pond	20	20
BR4B	Directly across river from BR4A	32	16
BR5A	At first storm sewer pipe entering pond	8,000+	8,000+
BR5B	Directly across pond from BR5A	7,800	4,000
BR6	At storm sewer entrance to pond	8,000+	8,000+
BR7	At two storm sewer pipes which enter Duck Pond from east	5,800	3,100
BR8A	At Conroy Ave. bridge south of Duck Pond	6,100	3,800
BR8B	Directly across river from BR8A south of bridge	7,800	3,600
BR9	Northwest shore of pond to south of the Duck Pond	7,300	3,700
BR10	On south shore of pond adjacent to railway tracks	6,300	1,200
BR11A	Across river from outflow of Septic Tank #2	6,500	2,400
BR11B	Slightly upstream from outflow of Septic Tank #2	7,900	600
BR11ST	Effluent from Septic Tank #2	80,000+	8,000+
BR12B	At mouth of river in Culver Park, where it enters Otto Lake	700	600

SWASTIKA
AMIKOUGAMI CREEK

TABLE II - RESULTS OF BACTERIOLOGICAL EXAMINATION

SAMPLE NUMBER	LOCATION	COLIFORM COUNT Per 100 mls TOTAL	FAECAL
AC-1	Before Entry to Blanche River, just before ONR bridge	500	500
AC-2	South of Government Rd., East of railway tracks, at Chepeski residence	690	300
AC-3	At wooden bridge on Side Rd., south east of Highway #66	2,500	420
AC-4	At Kennedy residence, east of Highway #66	90	48
AC-5	At bridge near M.N.R. on Highway #66	660	38

SWASTIKA
AMIKOUGAMI CREEK

TABLE III - RESULTS OF BACTERIOLOGICAL EXAMINATION

SAMPLE NUMBER	LOCATION	COLIFORM COUNT Per 100 mls TOTAL	FAECAL
D-1	Sample from concrete catch basin adjacent to railway tracks, south of Peck Avenue	23,000	8,000+
D-2	Downstream from D-1, before entry to Blanche River	3,300	2,100
D-3	Ponding of water on Conroy Ave.	4,200	3,500
D-4	Ditch on the east side of Swastika Ave. south of Gold Avenue	5,100	2,800
D-5	Ditch flowing east on to Hays St. from Swastika Avenue area	80,000+	8,000+
D-6	Ditch flowing under Hays St. South of Communal sewer system	26,000	8,000+
D-7	Downstream from D-6, Possibly septic tank outflow into ditch from nearby residence	5,600	5,400
D-8	Discharge from unsewered house behind Esso Station on east side of Hays St.	80,000+	8,000+
D-9	Downstream from D-6, D-7, D-8 at entrance of ditch to Blanche River	510	44
D-10	Discharge behind Ministry of Natural Resources	60	2
D-11	Ditch behind Ministry of Transportation and Communications garage	9,000	200
D-12	Small pond behind Kirk Motel	80,000+	8,000+
D-13	Behind B.P. Gas Station located at Junction of Highway #66 and Highway #112	400	20

SWASTIKA - TABLE IV

CHEMICAL ANALYSIS(*UNITS ARE IN ppm UNLESS OTHERWISE STATED)

SAMPLE NUMBER	LOCATION	TOTAL KJELDAHL as N*	NITRATE as N	NITRITE as N	TOTAL PHOSPHORUS as P	CHLORIDE as Cl	Fe as Fe	COLIFORMS per 100 mls TOTAL	FAECAL
D-1	Catch basin adjacent to railway tracks, Peck Ave.	2.5	<.02	<.2	.12	27	—	23,300	8000+
D-2	Peck Ave. ditch	.7	<.02	<.2	.04	86	—	3,300	2100
D-3	Ponded water on Conroy Ave.	.4	<.02	<.2	.08	63	—	4,200	3500
D-5	Ditch water flowing east on to Hays St. from Swastika Avenue area	23	.04	<.2	5.0	82	46	80,000+	8000+
D-6	Downstream from D-5, on east side of Hwy 66	.8	<.02	<.2	.08	34	.90	26,000	8000+
D-8	Discharge from unsewered house behind Esso Station on east side of Hays St.	10	<.04	<.2	5.2	84	24	80,000+	8000+
D-9	Downstream from D-8, at mouth of ditch before entry to Blanche River	.8	<.02	<.2	.08	85	3.2	510	44
D-11	Ditch behind Ministry of Transportation & Communications' garage	7.0	<.02	<.2	.60	23350	12	—	—
BR1A	Blanche River, 50 ft. upstream from pumphouse	.6	<.02	<.2	.04	6	—	14	14
BR1B	Blanche River, across from BR-1A Duck Pond	.6	<.02	<.2	.08	5	—	26	14
BR-5	Duck Pond	.6	<.02	<.2	.04	14	—	8,000+	8000+
BR11ST	Effluent from Septic Tank #2	9.0	<.02	<.2	2.2	31	—	—	—
BR-11	Below Duck Pond	—	—	—	—	—	—	—	—
BR12B	At mouth of Blanche River, before entry to Otto Lake	.8	<.02	<.2	.04	10	12	700	600
AC-5	At bridge on Amikougami Creek on Hwy #66	.8	<.02	<.2	.04	91	—	660	38

Blanche River--

Amicougami Creek

Scale 1:50,000

• Sample Point

MAP # 2